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Descriptors-*Academic Achievement, Arithmetic, Educable Mentally Handicapped, *Exceptional Child Research, Goal Orientation, Intelligence Differences, Interest Scales, Measurement Instruments, *Mentally Handicapped, *Motivation, Predictive Measurement, Reading Achievement, Regular Class Placement, *Slow Learners, Socioeconomic Status, Special Classes, Spelling

To determine whether children with below average intelligence who are motivation oriented (MO) are different in school achievement from those who are oriented toward hygiene (HO), 72 children (ages 12 to 17, IQ's 50 to 89) subjects were divided into four groups of 18 by intelligence and by orientation as determined by the Choice-Motivator Scale: educable mentally retarded (EMR)-MO, dull normal (DN)-MO, EMR-HO, and DN-HO. The Metropolitan Achievement Test was administered; occupational ratings of 53 fathers were used to measure socioeconomic status (SES). The HO group was significantly higher in SES (p .05), but no significant differences were found between MO and HO groups in intelligence or in regular or special class placement. MO subjects were significantly higher than HO subjects in spelling and average achievement (p .05). In comparisons between IQ levels of the same orientation, the significant differences were in favor of the EMR subjects; between subgroups of differing orientation, significant differences in achievement favored the MO subjects (p .05 for both). MO subjects in regular grades achieved higher than HO subjects; in special classes the EMR-MO subjects achieved higher than the DN-MO and DN-HO subjects (p .05), and EMR-HO subjects achieved higher than DN-MO subjects (p .05). (RJ)

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MOTIVATION-HYGIENE ORIENTATION AND SCHOOL ACHIEVEMENT IN MENTALLY SUBNORMAL CHILDREN

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The research reported herein was conducted while the author was a graduate fellow in special education at George Peabody College for Teachers, Nashville, Tennessee.

ABSTRACT

Children (N=72) ages 12-16 years with below average psychometric intelligence (IQ=76) were selected for high-motivation or high-hygiene using the Choice-Motivator Scale, and were given Metropolitan Achievement Tests. Achievement deviations from MA expectancy were used as the criterion measures. Four subgroups were formed: educable mentally retarded motivator oriented (EMR-MO), educable mentally retarded hygiene oriented (EMR-HO), dull normal motivator oriented (DN-MO), and dull normal hygiene oriented (DN-HO). MO Ss scored higher relative to MA expectancy than HO Ss. A significant interaction was obtained between motivational orientation and academic achievement. EMR-MO Ss were achieving higher than DN-HO Ss on reading, spelling, arithmetic and average achievement. No differences were obtained between DN-MO and EMR-HO Ss. Additional analyses among subgroups were partially supportive of the predictions made from motivation-hygiene theory regarding academic success.

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The concept of motivation has probably received more attention than any other personality variable included under the framework of behavior theory. Nearly every contemporary theory of learning places motivation in a position of central importance within the theory (Thorndike, 1913; Lewin, 1935; Hull, 1943; Mowrer, 1952; Spence, 1956). Modern education also recognizes motivation as one of the important complex variables associated with educational adjustment and school achievement, and often uses the term vaguely to explain discrepancies between adequate versus inadequate educational adjustment of individuals.

The earliest demonstrations of the importance of motivation in learning in humans come from the studies showing the superiority of intentional learning (Meyers, 1913; Bromer, 1942; Huang, 1944). One avenue of research on human motivation has stressed external and situational factors rather than internal, enduring states. These studies are concerned with incentives influencing motivation, such as knowledge of results, level of aspiration, praise, reproof, and social interactions. Application of such incentives to overall performance typified the early work in this field (Hurlock, 1925; Thorndike, 1927; Sims, 1928). A generally satisfactory conclusion of the effects of praise and reproof could not be reached from these early studies because of the complexity of the incentives. A more definitive technique, the level of aspiration, was

developed by Lewin (1935) to study the influence of incentives on specific responses to a task. This aided understanding of incentive value and the ways an individual reacts to his own or others' performance (Lewin, et al., 1944; Diggory, 1949; Sutcliffe, 1955). Incentives as social factors and processes have been studied as they influence human performance (Cartwright, 1959). The early work of Allport (1920, 1924), and Dashiell (1935) concerned itself with the controversy over the influence of competition on performance in social situations. Later the work on social factors concentrated on the issues of group processes, conformity, social pressure, opinion change, and ego-involvement.

For some, motive states have been viewed as internal, lasting characteristics of individuals equivalent to hunger and thirst in the heirarchy of needs (Mowrer, 1950; Gewirtz and Baer, 1958; Schachter, 1959). Fear, anxiety, aggression, and dependency are considered as the forces underlying these learned motive states (Taylor, 1956; Spence, 1958; Mandler and Sarason, 1952; Sears et al., 1953; Miller and Dollard, 1941). The equivalence of the achievement motive to physiological needs is less precise in studies conducted by McClelland and his associates (1955, 1958); however the focus is still on the internal, enduring nature of the motive state. The n-Ach motive of McClelland is primarily a measure of achievement motive derived from

a content analysis of a modified Thematic Apperception Test (TAT) although there are alternative methods to the TAT analysis.

Specifically with the retarded, the problem of motivation has been largely studied through the manipulation of incentives: tangible rewards, social reinforcement, and primary and secondary reinforcement (O'Connor and Tizard, 1954; Cantor and Hottel, 1955; Walton and Begg, 1958; Ellis and Pryer, 1958; Heber, 1959; and Wolfensberger, 1960). Another approach has been through the use of the modified projective techniques of McClelland (1953) for evaluation of achievement motivation with mentally retarded children. Tolman and Johnson (1958) studied thirteen pairs of organic and familial retarded children in an institutional population. The organic children showed less desire for achievement and affiliation with other children than familial retarded children. Achievement motivation in both groups decreased as the length of time in an institution increased. Also using McClelland's method, Jordan and deCharms (1959) evaluated the conceptual and empirical status of the achievement motive in mentally retarded children in special classes (mean CA 15.0, IQ below 75), educable adolescent males in regular classes (mean CA 15.2, IQ below 75), and a comparable group of normals (mean CA 15.7, IQ above 75). They could find no evidence of a relationship between achievement motivation

and academic achievement, and concluded that, at the time of their study, the method was not applicable to the prediction of academic achievement.

Some recent findings in the field of industrial psychology offer promise of defining some of the motivational factors that differentiate between high and low academic achievement in children.

The motivation-hygiene concept originally appeared in The Motivation to Work (Herzberg, Mausner, and Snyderman, 1959), in which a series of studies in industrial psychology were reported. By factor analysis two clusters of job or work incentives were found, one cluster relating to positive job satisfaction and one which, while not involved in positive satisfaction, was sufficient to arouse job dissatisfaction of industrial workers. Persons who were characterized by job satisfaction focused on aesthetics, achievement, creativity, status, and enjoyment. The work adjustment of these individuals was strongly oriented toward self-actualization or self-realization and designated motivator oriented (MO). The other set of factors, relating to job dissatisfaction, were designated hygiene orientation (HO).

The term hygiene was used because of the analogy between these factors and medical hygienic measures which serve as means for preventing harmful reactions through environmental control. "Hygiene" factors described the

job environment and served mainly as preventatives of additional job dissatisfactions, but were not effective in altering job attitudes to a positive state of satisfaction. The HO individuals focused on the environmental concerns of salary, ease, safety, practicality, health, and security in their jobs. An important concept, according to the authors is that the orientation (motivator or hygiene) of an individual is the result of his training and experiences, and is, consequently, learned behavior.

Extending the motivation-hygiene concept to personal adjustment, Herzberg and Hamlin (1961) inferred that the MO individual is one who is adjusted to himself, whereas the HO person seeks an avoidance adjustment to the environment. They hypothesize that the motivator factors are necessary for growth since they provide the psychological stimulation for activation of self-realization needs. Even when lack of opportunity does not adequately reinforce growth needs and avoidance of discomfort from poor hygiene factors, MO individuals will fail to become mentally ill. They will, instead, continue to obtain some satisfactions primarily from motivator factors. On the other hand, while hygiene factors may serve as a primary source of satisfaction for individuals who are fixated at an immature level of personality adjustment, satisfaction of hygiene needs serves only to prevent mental illness rather than produce mental health. These views were partially

supported in a study by Hamlin and Nemo (1962) who developed the Choice-Motivator Scale for measuring the motivation-hygiene orientation of individuals. Using the scale, they compared two groups of schizophrenic patients matched on diagnosis and age. One group consisted of unimproved chronic schizophrenics (mean CA 39.6). The other group was former schizophrenic patients (mean CA 40.0) with no acute psychotic symptoms at the time. A third group composed of college students (mean CA 20.2) was added to test the assumption that university undergraduates are motivated toward self-actualization. There was no attempt to match this group with the two schizophrenic groups. All three groups consisted of 23 subjects. The improved schizophrenic group gave significantly more Motivator responses than the unimproved group (p .001). When allowance was made for the greater number of unscorable schizophrenic responses given by the unimproved subjects, the percentage of Hygiene responses was significantly higher for the unimproved group (p .001). Tests for significant differences were not reported for the college student group; however there was a consistent tendency toward higher Motivator and lower Hygiene scores when compared with both schizophrenic groups. These data suggest that HO is associated with mental illness while MO is related to mental health.

Haywood and Dobbs (1964), using the S-R Inventory of Anxiousness (Endler, Hunt, and Rosenstein, 1962), the

Choice-Motivator Scale, and a manifest anxiety scale presented data on high school age males. They found a significant relationship between high MO as measured by the Choice-Motivator Scale and high approach tendencies measured by the S-R Inventory of Anxiousness. Individuals with high approach scores were characterized by a tendency to seek, rather than decrease, tension (Haywood, 1962). The group of HO individuals scored significantly higher on the avoidance mode of response of the S-R Inventory of Anxiousness. Avoidance is defined as the tendency to move away from tension-inducing situations. Positive correlations existed between manifest anxiety scores and avoidance scores. They suggest that HO is a consequence of conditioned behavior. These findings are important because they serve to unify the incentive factors found by Herzberg with some motivational concepts that point to anxiety as an underlying motive state in human motivation. Discussing the implications of the motivation-hygiene concept Haywood and Dobbs (1964, p. 378) state that "If the environmental orientation reflects learned behavior, then it can be unlearned, perhaps by substitution of incompatible approach behaviors in social therapeutic situations such as psychotherapy groups, school, and social organizations."

In relating the motivation-hygiene concept to school achievement problems of children, Haywood presented data

from an unpublished study involving the Choice-Motivator Scale. The study was conducted at the Peabody Child Study Center. Teachers were asked to refer two children who were matched on age, sex, and IQ. One of the two children referred by each teacher was selected because of an existing reading problem, while the other child had no reading problem. On pre-test data, the remedial reading group was higher on the hygiene variable and lower on the motivator variable than the contrast group. The remedial reading group was also less well-adjusted than the control group as measured by the Coopersmith Self-Evaluation Inventory. The control group had higher MO and higher manifest anxiety. Following 8 weeks of remedial instruction during the summer the remedial reading group who had improved in reading had significantly higher motivator scores than previously. Children who had not improved in reading dropped on the motivator variable.

An unpublished study by Haywood and Wachs (1965) found that HO adolescent boys of average intelligence required more trials to criterion on a visual size-discrimination task than MO boys of comparable age and intelligence. They also found the same relationship between HO and MO boys of below average intelligence. In the average intelligence group, MO subjects relearned after a delay faster than HO subjects. In the below average intelligence group, more HO subjects failed to learn the discrim-

ination and required more total trials to reach a learning criterion than the MO subjects.

The motivation-hygiene concept was related to mental retardation by Haywood (1964, p. 6) as follows:

"When intellectual capacity is limited, opportunities to learn a task or motivator orientation through the reinforcement mechanism of successful completion of interesting tasks are far less frequent than in the case of persons without so obvious an intellectual limitation. On the other hand, such a retarded person may easily learn both to seek his personal satisfaction in environmental concerns (Hygiene orientation) and to avoid engaging in tasks in which he is likely to fail."

The study of the invluence of motivation on school achievement in children of low intelligence should be a fruitful and needed topic for research for at least two reasons: (1) work with mentally subnormal children in this area is indeed scanty; and (2) the development of the motivation-hygiene concept (Herzberg and Hamlin, 1961) and the Choice-Motivator Scale (Hamlin and Nemo, 1962) has opened up a new approach to the problem. Dunn (1963) reasons that negative pupil attitudes and motivation may be greater detriments to school achievement than low levels of intellectual capability. The possibility exists that differences in school achievement may be accounted for by

at least two modes of adjustment, such as the motivation-hygiene concept proposed by Herzberg and Hamlin (1961).

It was expected in the present study that among children with intelligence quotients between 50-89 inclusive, those who are strongly tast oriented (MO) would be different in school achievement from those who are oriented toward hygiene motives.

Method

Children who served as subjects in this study were located in five public schools in Nashville, Tennessee. The following criteria were used in choosing the sample: (1) chronological ages between 12.0 and 17.0 at the time of the study; (2) Peabody Picture Vocabulary Test intelligence quotients between 50 and 89; and (3) current achievement scores on reading, spelling, and arithmetic subtests of the Metropolitan Achievement Tests. The PPVT Form A was administered individually or in small groups of two to eight children. The 164 children who met the above criteria were given the Choice-Motivator Scale. Metropolitan Achievement Tests were being administered by the schools during the same period of time that the PPVT and Choice-Motivator Scale were being given to the subjects. Each child was asked to give his father's occupation which was then ranked on the Prestige Occupational Scale for the purpose of defining the socio-economic status of each group.

All data were gathered within a four and one-half month period.

Difference scores were derived from the Choice-Motivator Scale by subtracting the sum of hygiene responses from the sum of motivator responses for each subject. Motivator orientation was defined as the top quartile of the difference score distribution on the Choice-Motivator Scale. Hygiene orientation was similarly defined as the bottom quartile of the difference score distribution. Two intelligence groups were constituted on the basis of the median IQ (77.96) for the total number of children in the motivation-hygiene categories. Since the IQ ranges for each intelligence level approximated the commonly used classifications of educable mentally retarded (EMR) and dull normal (DN), these two terms are used to refer to the low and high IQ levels of the sample.

Eighteen children were randomly selected from each intelligence level for both the MO and HO groups, making a total of four groups of subjects; educable mentally retarded motivator oriented children (EMR-MO), educable mentally retarded hygiene oriented children (EMR-HO), dull normal motivator oriented children (DN-MO), and dull normal hygiene oriented children (DN-HO). Thus, the total sample comprised 72 children between the ages of 12.0 and 17.0 years and psychometric intelligence between 50 and 89. Means and standard deviations on CA, MA, and IQ for the

MO and HO groups and all subgroups are presented in Table 1.

Thirty-nine of the 72 subjects were in regular classes from 4th to 11th grade. Thirty-three children were enrolled in public school day classes for educable mentally retarded children.

Table 1

Means and Standard Deviations on CA, MA, and IQ

Group		CA	MA	IQ
Total MO	Mean	14.04	9.58	76.11
	S.D.	1.27	1.61	8.51
EMR-MO	Mean	14.18	8.53	69.44
	S.D.	1.09	1.33	6.60
DN-MO	Mean	13.91	10.63	82.78
	S.D.	1.39	1.09	3.40
Total HO	Mean	14.12	9.86	76.97
	S.D.	1.24	1.49	8.15
EMR-HO	Mean	14.25	8.76	70.00
	S.D.	.96	.95	5.28
DN-HO	Mean	14.00	10.95	83.94
	S.D.	1.53	1.07	3.04

Grade placement data is shown in Table 17 of Appendix A. There was no attempt to exclude non-white children from

the sample, however none appeared in either the MO or HO groups.

Instruments used:

The intelligence quotient and mental age of each subject was obtained by administering the PPVT which was developed by Dunn, L.M. (Minneapolis, Minnesota: American Guidance Service). The procedure for administration calls for the subject to select the appropriate picture from a group of four to match each verbally presented stimulus word. Form A of the test was used for all subjects. The PPVT has been shown to be a reasonably stable instrument for average and mentally retarded children ages 2.6 to 18 years. No significant differences were found by Norris, Hottel and Brooks (1960) in alternate form reliability scores for 60 fifth grade pupils of average intelligence. The reliability coefficient for age equivalent scores was .83 when Dunn and Brooks (1959) administered both forms to 371 educable mentally retarded children of ages 7 to 16 years. For ages 12.0 to 7.0 years alternate form reliability quotients range from a low of .70 at the 13.0 year level to a high of .84 at the 17.0 year level. The standard errors of measurement for IQ's within this age group range from 6.00 to 8.22. A validity quotient of .76 was found between vocabulary age and the Revised Stanford Binet, Form L mental age for 315 educable retardates ages

7 to 16 years in the study by Dunn and Brooks (1959).

The Metropolitan Achievement Test was used as the measure of achievement. Form Am was consistently used for all children. Split-half reliability coefficients for the Metropolitan Achievement Test are of the magnitude of approximately .85 to .95 for each of the reading, spelling, and arithmetic subtests, with the median for each of these subtests generally being about .90. Standard errors of measurement are, in terms of raw score, from 2.1 to 3.5 with medians of approximately 2.5. Subjects were administered the level of the test appropriate for their grade level. Reading, spelling, arithmetic, and average achievement were used as criterion measures. The arithmetic score for each subject is the average for arithmetic computation and arithmetic reasoning. Average achievement for each subject was calculated by obtaining the average of the reading, spelling, and arithmetic grade placement scores. The achievement data used in the analysis were deviations from MA expectancy for each subject on each subtest. Expectancy scores were obtained by the Rule of Five method (Dunn, 1963).

The measurement for motivation-hygiene orientation was the Choice-Motivator Scale (Hamlin and Nemo, 1962). All subjects were administered Form B of the Scale which consists of twenty pairs of vocational choices. Hamlin and Nemo (1962) obtained delayed parallel form reliability

coefficients for three groups of subjects. The coefficients for Motivator-Hygiene categories were .67 and .65, respectively, for a group of unimproved schizophrenics. For improved schizophrenics the reliability coefficient was .67 for the Motivator category and .69 for the Hygiene category. Reliability coefficients for a group of college students were .48 for Motivator scores and .60 for Hygiene scores. Kahoe (1963) obtained interscorer reliabilities of .94 and .89 on samples of college students for the sum of Motivator and the sum of Hygiene scores respectively. Each subject in the present investigation was asked to select one preference from each pair of vocational choices and state the reason for his choice. Multiple responses for each choice were tallied as long as there were clear-cut reasons. The stated reasons were scored by manifest content analysis. Response units were tallied in 22 subcategories grouped into seven major response areas: Motivator, Hygiene, Familiarity, Social, Simple Preference, Avoidance, and Schizophrenic. Only the motivator and hygiene responses were of concern in this study. Reasons which involved esthetics, achievement, creativity, status, and enjoyment were scored as motivator responses. Responses were scored in the Hygiene category when the reasons given were concerned with salary, ease, safety, practicality, health, or security.

Results

It was expected that there would be no differences among groups in this study on the variables of socio-economic status, age, sex, IQ, and race. To verify each of these assumptions a test of differences was made for each of these five variables. The .05 level of significance was used throughout.

Occupational ratings were obtained for 53 fathers of the 72 subjects used in this study. As a total group the Ss would be considered as coming from the lower socio-economic population. While the national mean for the Prestige Occupational Scale is 69.89, the mean rating for this total sample was found to be only 55.53. Means and standard deviations of the groups on socio-economic status are presented in Table 2.

Table 2

Means and Standard Deviations of Socio-economic Status

Group	N	Mean	Standard Deviation
EMR-MO	14	47.14	3.38
DN-MO	15	57.00	10.73
EMR-HO	10	58.70	7.32
DN-HO	14	60.14	6.62
Total MO	29	52.24	11.65
Total HO	24	59.24	6.66

Significant differences in socio-economic status between MO and HO groups were tested by using the median test (Siegal, 1956), and the results of these comparisons may be seen in Table 3.

Table 3

Differences between Groups on Socio-economic Status

Comparison	N	df	χ^2
MO vs HO	53	1	4.94*
EMR-MO vs EMR-HO	24	1	4.28*
EMR-MO vs DN-HO	28	1	7.74*
EMR-MO vs DN-MO	29	1	5.80*
EMR-HO vs DN-HO	25	1	1.13
EMR-HO vs DN-MO	24	1	.18
DN-MO vs DN-HO	29	1	.30

*$p < .05$

The extension of the median test (Siegal, 1956) was inappropriate for testing for significant differences in socio-economic status among the four subgroups because of small cell frequencies; therefore the differences among subgroups were tested by a Kruskal-Wallis one-way analysis of variance ($H=12.59$, $df=3$, $p<.01$). There was a significant difference between MO and HO groups on socio-economic status and among the four subgroups used in the analysis. The HO group was

significantly higher in socio-economic status on the average than the MO group. A wide range of occupational prestige ratings was obtained for the total MO group, with the widest range occurring in the DN-MO group; however, the spread of occupations represented in the total sample was narrow in comparison with the total range of possible occupations. Subgroup comparisons revealed that EMR-MO subjects were significantly below the level of the other three subgroups.

A chi-square test for independent samples was used to test for differences among groups on the variable of sex. It was found that there were no significant differences in the ratio of boys and girls among all four subgroups ($\chi^2 = 1.46$, df = 1).

The chi-square test was also used to test for age differences among all subgroups. The results support the assumption of no significant differences in age among groups ($\chi^2 = 1.34$, df = 3), nor between MO and HO groups ($\chi^2 = .22$, df = 1).

A t test was used to test for IQ differences between groups. No significant difference was found between MO and HO groups on IQ ($t = .22$, df = 70). A t test for significant differences in IQ between DN-MO and DN-HO groups ($t = 1.76$, df = 34) and between EMR-MO and EMR-HO groups ($t = 1.03$, df = 34) indicated no significant differences between either pair of these subgroups.

A chi-square test to determine the difference between the proportion of MO and HO subjects regardless of IQ level in special and regular classes yielded a non-significant value of .89 (df = 1). Among subgroups, no significant differences were found between the number of MO and HO subjects in special and regular classes (χ^2 = 3.01, df = 3). The proportion of DN-MO and DN-HO in special and regular classes was essentially the same (χ^2 = .14, df = 1). There was no significant difference between the number of EMR-MO and EMR-HO subjects in special and regular classes (χ^2 = 1.53, df = 1). The raw data used for all tests of differences among groups on socio-economic status, sex, age, IQ, and class placement are presented in Appendix A.

The means and standard deviation of scores of subtests on the Metropolitan Achievement Tests for each group and subgroup are given in Table 4. Differences between the obtained and expected achievement level were used as the criterion scores; therefore the means in the table are the average of these deviations. The Rule of Five method (Dunn, 1963) was used to compute expectancy scores. The average achievement score for each subject was obtained by averaging the scores for reading, spelling, and arithmetic. A test was made for hetereogeneity of variance. The obtained $F_{max.}$ for between subjects of 2.75 exceeded the critical value of 1.96 at the .95 level of confidence. An

obtained $F_{max.}$ of 3.64 within subjects exceeded the critical value of 3.12 at the .95 level of confidence. Consequently, the critical values of F, although consistently interpreted at the .05 level of significance were actually obtained by referring to the tabled values for the .025 level. This is the procedure recommended by Lindquist (1953, p. 96) to avoid overstating the probability of a Type I error.

Table 4

Means and Standard Deviations for Achievement

Group		Achievement Subtest			
		Reading	Spelling	Arithmetic	Average
Total MO	Mean	-0.20	1.00	0.70	0.50
	S.D.	1.91	2.45	1.85	2.00
EMR-MO	Mean	-0.60	1.30	1.50	1.10
	S.D.	1.61	2.42	1.30	1.64
DN-MO	Mean	-0.80	0.70	-0.10	-0.10
Total HO	Mean	-1.00	-0.40	0.10	-0.10
	S.D.	1.37	1.57	1.42	1.28
EMR-HO	Mean	-0.50	0.00	0.40	0.00
	S.D.	1.13	1.30	1.42	1.50
DN-HO	Mean	-1.50	-0.90	-0.20	-0.70
	S.D.	1.42	1.72	1.37	1.41

The data were analyzed in a Lindquist Type III mixed design analysis of variance (Lindquist, 1953). The results are summarized in Table 5. The main effects corresponded to Achievement (A), Motivation-hygiene Orientation (B), and Intelligence (C) Groups.

Table 5

Summary of Analysis of Variance of Achievement

Source	df	MS	F
Between Subjects	71		
Orientation (B)	1	60.87	6.42*
IQ Level (C)	1	71.00	7.49*
Orientation X IQ Level (BC)	1	1.90	.20
Error (b)	68	9.48	
Within Subjects	216		
Achievement (A)	3	15.11	21.28*
Achievement X Orientation (AB)	3	2.35	3.31*
Achievement X IQ Level (AC)	3	.66	.93
Achievement X Orientation X IQ Level (ABC)	3	1.41	1.99
Error (w)	204	.71	
Total	287		

*p<.05.

MO subjects achieved significantly higher than HO

subjects. The mean achievement deviation from MA grade expectancy was 0.50 for the MO group, and -0.40 for the HO group. Between IQ levels DN subjects achieved significantly lower than EMR subjects who did not necessarily make higher absolute achievement scores than DN subjects, but achieved at a higher level with respect to their own MA's. The achievement subtest pattern varied significantly within subjects, and an interaction was found between achievement subtests and motivation-hygiene orientation. These relationships are depicted graphically in Figures 1 and 2. Consequently a complete analysis of achievement differences between and within groups was undertaken.

Analysis of achievement differences between the total MO and HO groups showed MO subjects to be superior to HO subjects in spelling and average achievement. The results are indicated in Table 6.

Table 6

The t values between MO and HO Groups on each Achievement Subtest

	Reading	Spelling	Arithmetic	Average
MO vs HO	1.60	3.00*	.80	2.00*

*$p < .05$.

Table 7 indicates that significant differences were obtained among the four subgroups on each of the achievement

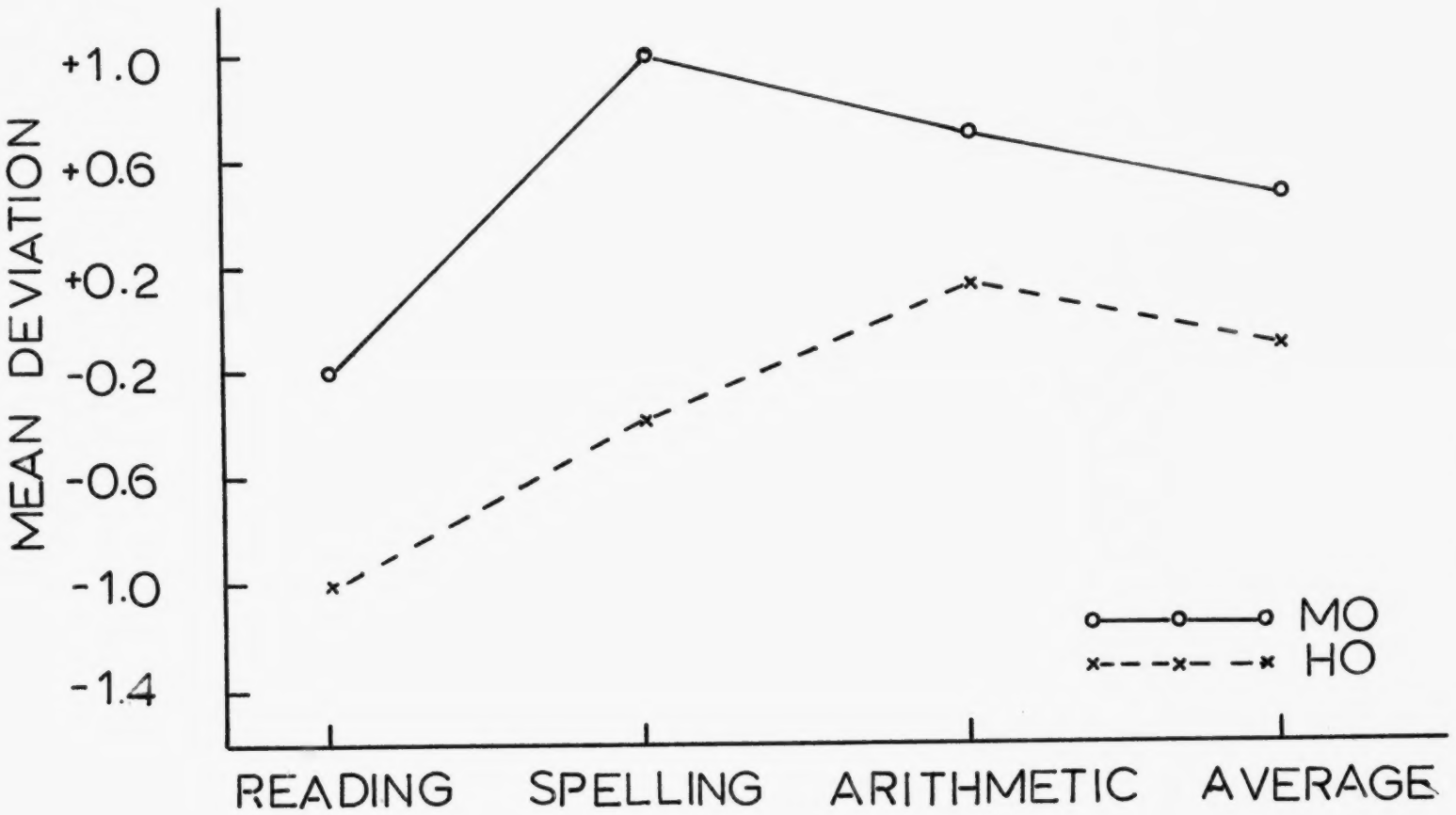

Fig. 1. Mean deviation from grade expectancy for total MO and HO groups.

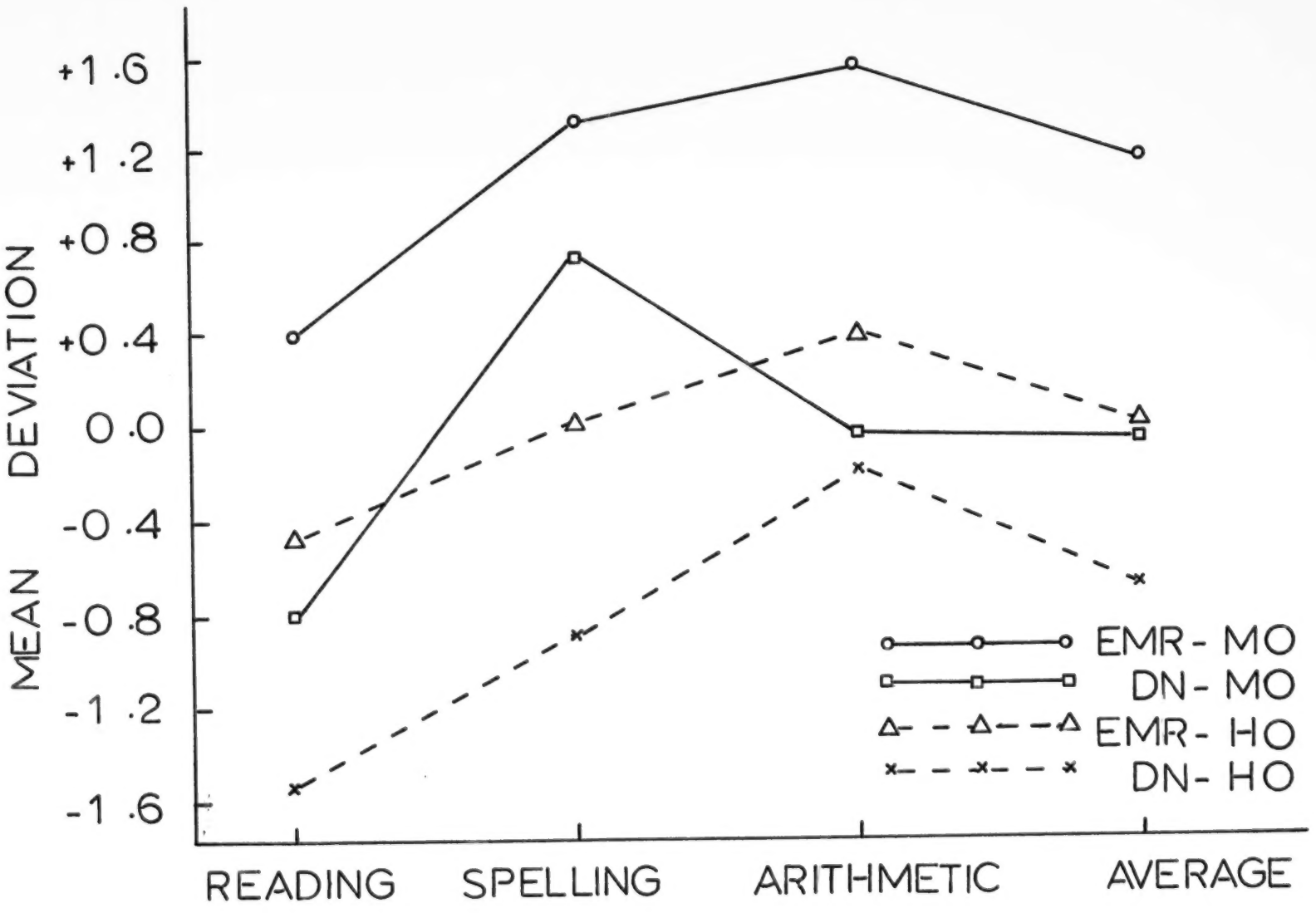

Fig. 2. Mean deviation from grade expectancy for subgroups.

subtests.

Table 7

Summary of Analysis among MO and HO Subgroups for each Achievement Subtest

Subtest	df	s^2	F
Reading	3	2.79	5.58*
Spelling	3	4.71	6.73*
Arithmetic	3	2.77	5.54*
Average	3	2.96	6.43*

*p .05.

The results of t tests between subgroups on each achievement subtest are shown in Table 8. The EMR-MO

Table 8

The t values between MO and HO Subgroups on each Achievement Subtest

Comparison		Achievement Subtest			
		Reading	Spelling	Arithmetic	Average
DN-MO vs EMR-MO	34	2.40*	.86	3.20*	2.61*
DN-MO vs DN-HO	34	1.40	2.29*	.20	1.30
DN-MO vs EMR-HO	34	.60	1.00	1.00	.22
EMR-MO vs DN-HO	34	3.80*	3.14*	3.40*	3.91*
EMR-MO vs EMR-HO	34	1.80	1.86	2.20*	2.39*
EMR-HO vs DN-HO	34	2.00*	1.29	1.20	1.52

*p .05.

subjects performed significantly higher with respect to MA grade expectancy than the other three subgroups and the DN-MO subjects were significantly higher than DN-HO subjects. The difference between DN-MO and DN-HO was accounted for entirely on the basis of a difference in spelling achievement. No differences were found between DN-MO and EMR-HO subgroups. Both of these latter subgroups performed very close to MA expectancy. The EMR-MO group performed significantly better than EMR-HO on arithmetic and average achievement. These results indicate that when comparisons were made between IQ levels of the same motivation-hygiene orientation, the significant differences were in favor of the EMR subjects. Between subgroups of differing motivation-hygiene orientation, significant differences in achievement were consistently in favor of MO subjects.

The finding of significant differences among achievement subtests was subjected to further analysis and the results are presented in Tables 9 and 10. It should be noted that since the error (w) could not be assumed to be homogeneous for both MO and HO groups, the Achievement X Subjects interaction mean square for each of the motivation-hygiene orientation groups was used as the appropriate error term for determining the significance of differences within subgroups (Lindquist, 1953). Table 9 shows that the differences among achievement subtests were significant for the groups of EMR-MO and DN-MO subjects but not the

Table 9

Analysis of Achievement Differences within Subgroups

Group	df	s^2	F
EMR-MO	3	4.62	6.24*
DN-MO	3	3.40	4.59*
EMR-HO	3	2.25	3.04
DN-HO	3	1.68	2.28

*$p < .05$.

EMR-HO or DN-HO groups. Orthogonal comparisons for significant differences between achievement subtest means revealed that reading was significantly lower when compared with the other three achievement measures. However, t test comparisons between achievement subtests within each MO and HO group according to IQ level yielded only one significant difference. Spelling was significantly higher than reading in the DN-MO group. These results are summarized in Table 10.

Table 11 shows the results of comparisons made between all possible combinations of total MO and HO groups according to special and regular class placements. These t tests are based only on the mean deviation from MA expectancy for average achievement scores. The MO subjects in regular classes were significantly higher in average achievement than the HO subjects in special and regular classes, and MO subjects in special classes.

Table 10

The t values between Achievement Subtests

within each MO and HO Subgroup

Achievement	Group			
	EMR-MO	DN-MO	EMR-HO	DN-HO
Reading vs Spelling	1.22	2.03*	.68	.81
Reading vs Arithmetic	1.49	.95	1.22	1.76
Reading vs Average	.95	.95	.68	1.08
Spelling vs Arithmetic	.27	1.08	.54	.95
Spelling vs Average	.27	1.08	0.00	.27
Arithmetic vs Average	.54	0.00	.54	.68

*p<.05.

Table 11

Average Achievement Comparisons between Groups

according to Class Placement

	N	t
MO Reg. Cl. vs HO Sp. Cl.	41	5.26*
MO Reg. Cl. vs HO Reg. Cl.	39	2.50*
MO Reg. Cl. vs MO Sp. Cl.	36	4.62*
MO Sp. Cl.vs HO Sp. Cl.	32	.43
MO Sp. Cl. vs HO Reg. Cl.	31	2.69*
HO Sp. Cl. vs HO Reg. Cl.	35	2.29*

*p<.05.

No significant differences were found between MO and HO subjects in special classes. The HO subjects in regular classes had significantly higher average achievement scores than either the MO subjects in special classes or the HO subjects in special classes. These results are presented graphically in Figure 3.

Fisher's exact probability tests were used to compare the average achievement of subgroups according to class placement. Regular vs special class placements are shown in Table 12. In all cases, the regular class subjects achieved significantly higher relative to MA expectancy than special class subjects. Figures 4 and 5 depict these comparisons.

Table 12

Average Achievement Comparisons between Subgroups according to Class Placement

	N	p
EMR-MO Reg. Cl. vs DN-HO Sp. Cl.	14	.01048*
EMR-MO Reg. Cl. vs EMR-MO Sp. Cl.	23	.00006*
DN-MO Reg. Cl. vs DN-MO Sp. Cl.	18	.01282*
DN-MO Sp. Cl. vs DN-HO Reg. Cl.	18	.01471*
EMR-HO Sp. Cl. vs EMR-MO Reg. Cl.	22	.00011*
EMR-HO Sp. Cl. vs EMR-HO Reg. Cl.	17	.02941*
DN-HO Sp. Cl. vs DN-MO Reg. Cl.	18	.01587*
DN-HO Sp. Cl. vs DN-HO Reg. Cl.	18	.01471*

*$p < .05$, one tailed test.

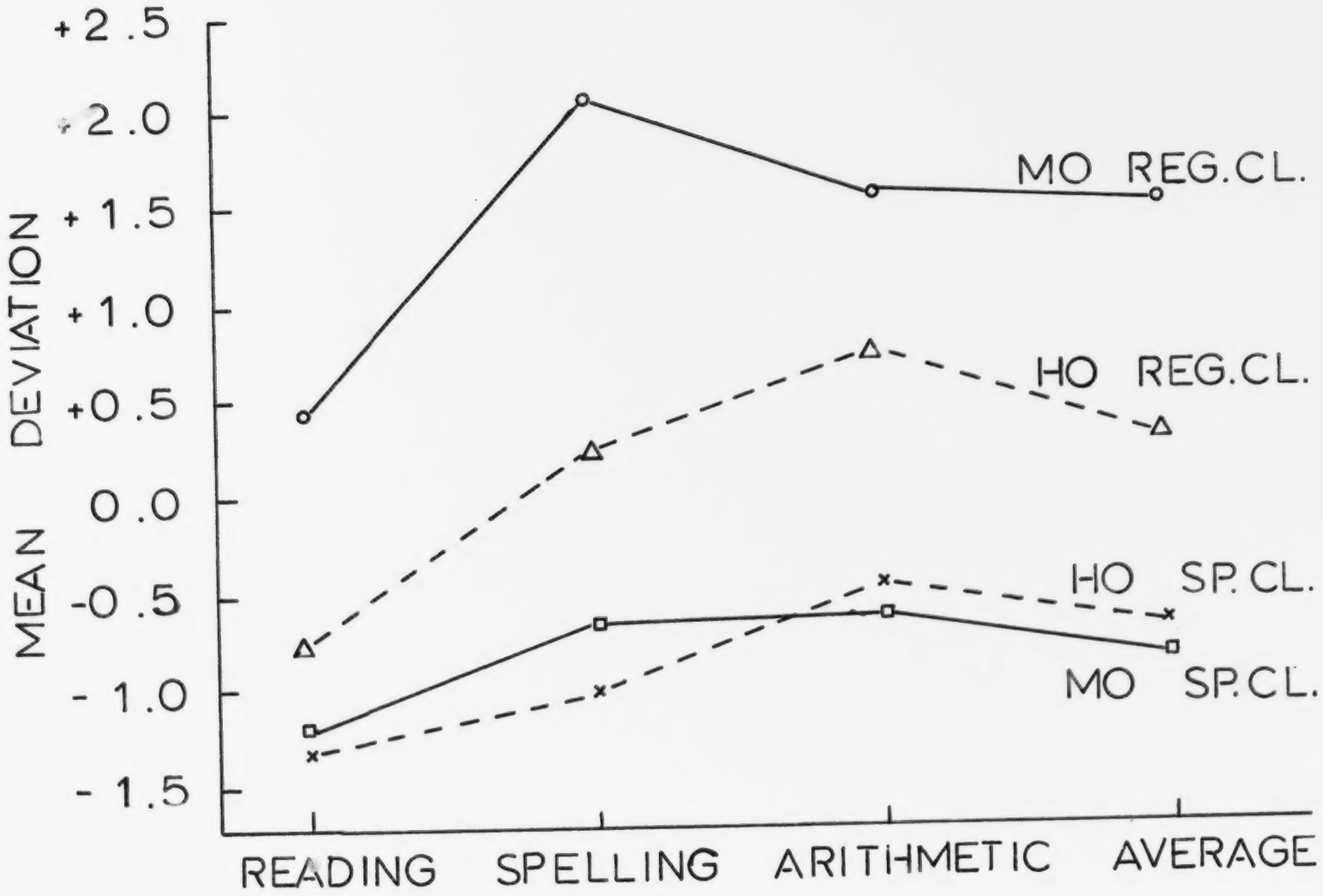

Fig. 3. Mean deviation from MA expectancy for total MO and HO groups by class placement.

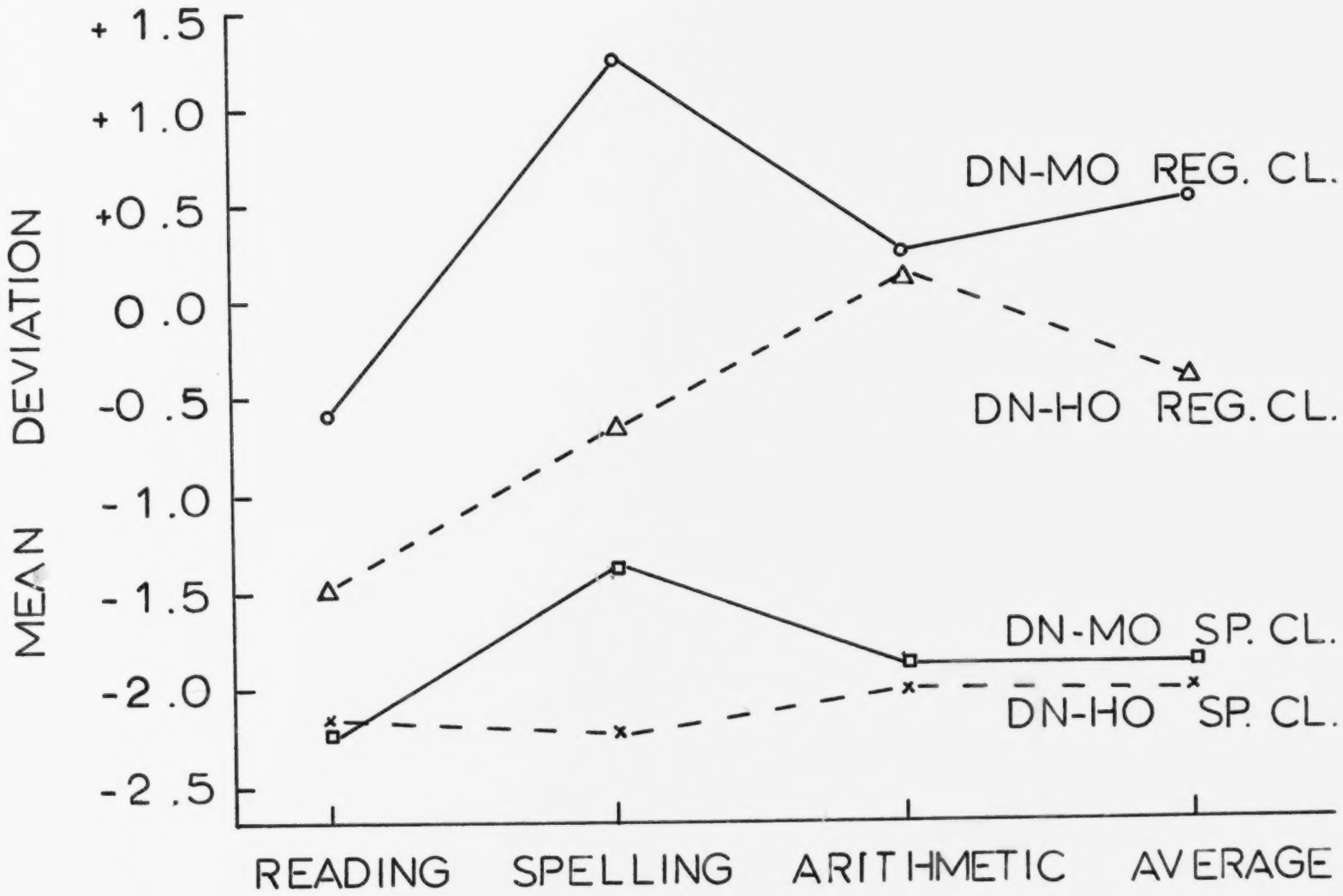

Fig. 4. Mean deviation from MA expectancy for dull normal subjects by class placement.

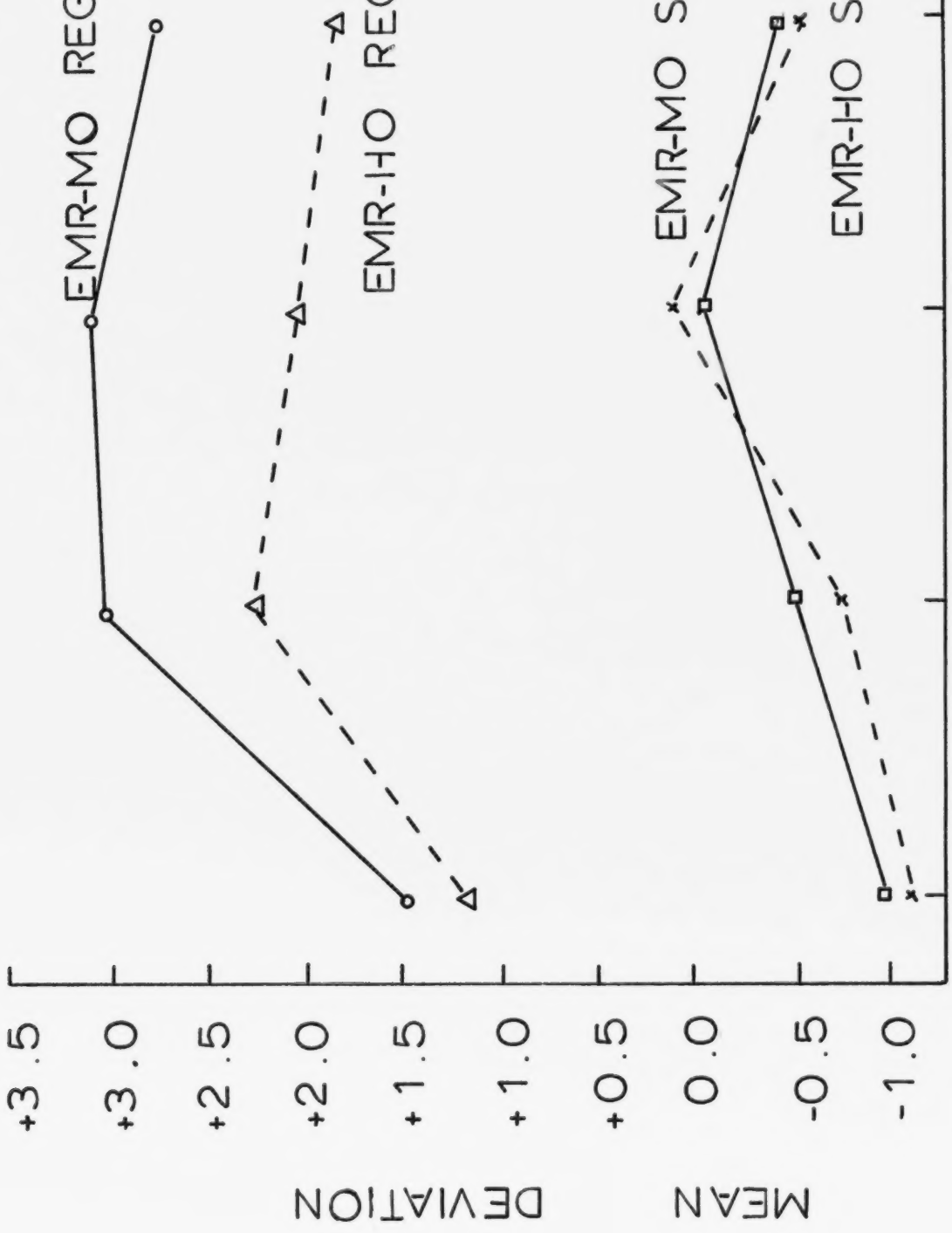

Fig. 5. Mean deviation from MA expectancy for educable mentally retarded subjects by class placement.

The results of comparisons between subgroups in regular classes are shown in Table 13. The EMR-MO subjects in regular classes had significantly higher average achievement scores relative to MA expectancy than either the DN-MO or DN-HO subjects in regular classes. The EMR-HO group in the regular grades achieved significantly higher on average achievement expectancy scores than the DN-HO subjects in the regular grades.

Table 13

Average Achievement Comparisons between Subgroups in Regular Classes

	N	p
DN-MO vs DN-HO	26	.18290
DN-MO vs EMR-HO	17	.21339
DN-MO vs EMR-MO	22	.00371*
DN-HO vs EMR-MO	22	.00002*
DN-HO vs EMR-HO	17	.02941*
EMR-MO vs EMR-HO	13	.33846

*$p < .05$, one tailed test.

No significant differences in average achievement expectancy scores were found between DN-MO and DN-HO, DN-MO and EMR-HO, or EMR-MO and EMR-HO subjects in regular classes.

Table 14 shows the results of comparisons between subgroups in special classes on average achievement.

Table 14

Average Achievement Comparisons between Subgroups in Special Classes

	N	p
DN-MO vs DN-HO	10	.499
DN-MO vs EMR-HO	18	.030*
DN-MO vs EMR-MO	14	.011*
DN-HO vs EMR-MO	19	.022*
DN-HO vs EMR-HO	18	.053
EMR-MO vs EMR-HO	23	.508

*$p < .05$, one tailed test.

The EMR-MO subjects in special classes were found to be significantly higher in average achievement expectancy scores than the DN-MO and DN-HO subjects in special classes, whereas the EMR-HO subjects in special classes achieved significantly higher than the DN-MO subjects in special classes.

Figures 3, 4, and 5 indicate that the MO subjects in regular grades maintained a consistent position of relatively higher average achievement than HO subjects in regular grades. The picture is less clear with special class groups. Except for a slight divergence in curves

between DN-MO and DN-HO special class subgroups on spelling these subgroups performed essentially the same on each achievement subtest.

Discussion

The results lend only partial support to the hypothesis that groups of mentally subnormal children differing in motivational system would also be differentiated on the basis of achievement in traditional school subjects. Specifically, the analysis revealed that school achievement was confounded with class placement; therefore the MO and HO groups were not directly comparable unless special and regular class placement was taken into consideration. This also had the effect of taking intellectual levels into account since the majority of EMR subjects were in special classes, while the majority of DN subjects were in regular classes. Comparisons of MO and HO subjects between intellectual levels indicated that EMR and DN subjects were distinctive groups relative to deviations from MA expectancy on achievement. Thus, the data suggested that class placement and intellectual level had to be considered in making meaningful interpretation of achievement differences between MO and HO groups.

Since significant differences between total MO and HO groups occurred only for regular class subjects, the Choice-Motivator Scale in its present form might be a more

effective measure of achievement differences due to motivational orientation for regular class subjects than for special class subjects. The finding of higher achievement relative to MA expectancy for EMR-MO subjects in both regular and special classes as compared with DN-HO subjects was probably due to the overall better performance of EMR subjects regardless of motivational orientation and class placement. However, it should be noted that subgroup comparisons were, in some cases, based on an extremely small number of individuals. This was especially true of EMR-MO and EMR-HO subjects in regular classes, and DN-MO and DN-HO subjects in special classes.

Several possible explanations may be offered for the finding of no significant differences between total MO and HO subjects in special classes. Besides the possibility that the Choice-Motivator Scale may not have been completely appropriate for use with special class subjects, there is the possibility that the special class subjects did, in fact, constitute a homogeneous group on the obtained achievement measures. As a consequence, the Choice-Motivator Scale may have been relatively insensitive to any small differences in measured achievement between MO and HO groups of the same intellectual level. The different motivational groups in special classes may actually have been the same on achievement measures. This could be due to an emphasis on other things besides academic subjects

in special classes. Another possible explanation hinges on the adequacy of the achievement measure for the respective groups. Teachers of special classes usually select for administration one level of a group achievement test on the basis of an assumed mean MA or grade equivalent. Since children in a given special class may vary widely in CA, many are considerably older than the level for which the test was constructed. This could result in accounting for less of the variability in achievement of special class subjects.

The finding of higher spelling achievement by DN-MO subjects relative to their reading achievement and in comparison with the DN-HO group, may be related to a fortuitous combination of motivator orientation and the processes by which this school subject is taught and learned. Spelling may be more easily reinforced and taught to children of low intelligence. Teachers and parents alike may stress this area of subject matter with maximum effects for the DN-MO subjects. These children with MO who are in regular grades may selectively invest more energy in spelling over other school subjects as a means of receiving positive reward. Finally, there is the possibility that the finding of superior spelling achievement for the DN-MO group was unique to this particular sample.

The EMR subjects, in terms of achievement in basic school subjects, appeared to be making a more adequate

adjustment than DN subjects. Educable mentally retarded subjects achieved higher relative to MA expectancy than dull normal subjects in each of the MO and HO groups. Factors other than motivational system alone may have been operating to cause lower achievement performance of DN subjects as compared with EMR subjects. Even though the main analysis indicated no significant differences between EMR-HO and DN-MO subgroups, the EMR-HO subjects in special classes were significantly higher in average achievement relative to MA expectancy than DN-MO subjects in special classes.

Implications for Education. At the present time, any discussion regarding the relevance of the motivation-hygiene concept to education must take into account the recent development of both the theory and the Choice-Motivator Scale. The theory with its attendant measure is still in the process of evolving through research. Considerable additional research is needed before any attempt is made to apply the concept precisely to educational practice, especially in understanding individual differences. Thus, the following observations should be viewed as tentative. From the above findings it appears that the motivation-hygiene concept may have potentiality for understanding individual differences in school achievement. Educators frequently notice that an individual child's academic performance is above or below that which is indicated by his measured intelligence. The reasons for this

discrepancy may be attributed to any number of subject variables which may influence motivation. One question often asked is related to what factors contribute to the kind of motivation believed to be capable of enhancing or hindering the academic performance of pupils. The results of this study suggest that the child of less than average intellectual ability who is characteristically oriented toward tasks for reasons of esthetics, achievement, creativity, status, and enjoyment may perform nearer to his achievement expectancy than a child of the same intellectual level who usually seeks ease, quiet, comfort, safety, practicality, health, and security from his environment. This finding appears parallel to recent research (Haywood and Dobbs, 1963) which suggests that persons with high motivator orientation tend to seek tension-inducing situations while hygiene orientated individuals tend to avoid such situations. In school situations, however, other factors may differentially influence motivation and achievement such as class placement and intellectual level. There may be other unidentified motivational variables which need to be considered in any attempt to understand individual differences in achievement performance. Physical health has been found to be related to motivation in retarded adults (Peck and Stephens, 1964). In addition, there is the possibility that a particular combination of motivation-hygiene characteristics may be most conducive to higher

school achievement.

Implications for research. Contingent upon the results, one of the primary purposes of this investigation was to determine whether or not additional hypotheses might be developed that would lead to refinement of the Choice-Motivator Scale as a means of understanding the relationship between motivation and achievement of children with impaired intellectual ability. It has been indicated that the significant findings were partially supportive of the predictions about school achievement that would follow from the motivation-hygiene concept; therefore further research along these lines would seem to be a profitable endeavor.

Development of a form of the Choice-Motivator Scale which would be appropriate for young children could serve as a useful means of identifying potential academic failures due to motivational variables if the environmental orientation reflects learned behavior. The data presented in this study suggests the need of a more precise measure of motivational system for predicting academic performance in mentally retarded children. A scale for young children might also provide a more precise measure of motivation for predicting achievement in mentally retarded children. If a valid and reliable measure of motivational system can be developed, techniques of behavior shaping or some other effective educational treatment mode might then be found

effective in changing the environmental orientation of young children and mentally retarded individuals for more productive learning in school, and personal and social adjustment in later life.

Development of any measuring instrument requires studies on the reliability and validity of that instrument with different groups. There is need for study of the Choice-Motivator Scale with different ages, mental ages, sexes, socio-economic statuses, physical limitations, and etiologies if possible, in a variety of school settings if an understanding of the relationships between motivator orientation, hygiene orientation and school achievement are to be approached from this concept. Since the EMR-MO subjects were significantly higher in achievement than the other three subgroups and significantly lower on socio-economic status, better control of this factor might be appropriate in further research. An individual's motivational orientation to his surroundings may differ or change under the influence of combinations of environmental and physical variables which could, in turn, affect school achievement.

Finally, replications of the present study with a variety of achievement instruments, different populations and statistical methods may serve to explicate the relevance of the findings included in this report. Subsequent studies might be designed for the investigation of only

one IQ category with more variables under consideration at a time. Research might also investigate the suggestion of this study that a particular combination of intelligence level, and motivational system may be fortuitous for some school subjects, whereas a different combination may be deleterious to achievement in certain other school subjects.

Summary

The motivational system influencing academic achievement in children of low intelligence was investigated within the context of the motivation-hygiene concept of mental health. Specifically, the hypothesis was that significant differences would be found between motivator-oriented (MO) and hygiene-oriented (HO) subjects of low psychometric intelligence on reading, spelling, arithmetic, and average achievement score which was averaged over the three skill subjects. Children with CAs 12.0 to 17.0 and IQs between 50 and 89 were selected from the Metropolitan Nashville Schools. The MO subjects were defined as those scoring in the top quartile of the distribution of difference scores and the HO subjects were defined as those scoring in the bottom quartile of the distribution of difference scores on the Choice-Motivator Scale. The MO and HO groups were then divided into two intelligence groups on the basis of the median IQ. The lower intelligence group had IQs between 55 and 77, while the higher intelligence group had IQs from 78 to 89 inclusive. Thus, the total sample of

72 children was comprised of four equal groups: educable mentally retarded MO (EMR-MO), educable mentally retarded HO (EMR-HO), dull normal MO (DN-MO), and dull normal HO (DN-HO) children. There were no significant differences between groups on CA, IQ, MA, sex, and race. Differences did exist among groups on socio-economic status with the EMR-MO groups being significantly below the other three subgroups on the Bendix Occupational Scale. However, the total sample was from the lower socio-economic level. Criterion measures were deviations from MA grade expectancy for each subject on reading, spelling, arithmetic, and average achievement from current Metropolitan Achievement Test scores.

Analysis of variance indicated statistically significant differences in academic achievement between MO and HO subjects for each intelligence group, consistently in favor of MO children. There was a statistically significant interaction of achievement and motivation-hygiene orientation for the combined groups, but this interaction was not found to be significant for DN-HO subjects. Educable mentally retarded subjects achieved higher relative to MA grade expectancy than dull normal subjects in each of the MO and HO groups; however, achievement performance was the same for EMR-HO subjects and DN-MO subjects. The EMR-MO subjects also had significantly higher achievement than the other three subgroups. Significant differences

were found between MO and HO subjects on each of the achievement subtests. Subjects in the EMR-MO group were superior to the DN-HO group on all of the achievement subtests and on average achievement. In addition, EMR-MO subjects achieved better on average achievement than HO subjects in both intelligence groups. Spelling achievement was higher for DN-MO than it was for HO subjects in the same intelligence group. Although there was a significant difference within subjects among achievement subtests for the total analysis, only the difference between reading and spelling in the DN-MO group proved significant within groups.

Viewing the special and regular class subjects as distinct groups, a significant difference was found in average achievement scores between DN-MO and DN-HO groups in regular classes in favor of DN-MO subjects. No significant differences were found in average achievement between EMR-MO and EMR-HO subjects in regular classes, or between motivation-hygiene groups of either intelligence level in special classes.

Since previous studies had not been conducted relating the motivation-hygiene theory to school achievement in children with low intelligence, comparative evaluation of these results was not possible. However, the results of this exploratory study were considered to be partially supportive of the predictions that can be developed from the theory regarding academic achievement of educable mentally retarded and dull normal children even though it

was originally generated from studies in industrial psychology.

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(2)

APPENDIX A

Table 15

Raw Scores for EMR-MO Subjects

Subject	Areas Measured[a]				
	Reading	Spelling	Arithmetic	Average	M-H[b]
1	1.7	1.0	3.2	2.0	7
2	1.7	2.0	1.7	1.8	5
3	4.7	7.3	5.9	5.9	11
4	3.0	3.0	3.3	3.2	6
5	4.2	2.4	5.9	4.6	4
6	3.9	3.8	4.7	4.1	4
7	2.7	3.3	4.0	3.5	9
8	6.3	5.7	6.6	6.3	10
9	4.7	6.5	8.9	7.3	5
10	3.5	4.4	6.7	5.3	6
11	3.4	6.8	3.0	4.1	6
12	3.6	3.8	4.6	4.2	4
13	5.3	8.2	6.8	6.8	7
14	3.7	3.8	4.2	4.0	6
15	3.4	4.7	4.3	4.1	4
16	5.7	6.5	5.0	5.6	6
17	4.7	6.8	6.2	6.0	9
18	4.2	6.1	5.6	5.4	5

[a]Metropolitan Achievement Tests scores. Average denotes a mean taken over reading, spelling, and arithmetic scores.

[b]Choice-Motivator Scale difference scores.

Table 15

Raw Scores for DN-MO Subjects

Subject	Areas Measured[a]				
	Reading	Spelling	Arithmetic	Average	M-H[b]
1	5.7	6.8	4.4	5.6	4
2	3.9	2.7	5.6	4.1	5
3	4.2	4.2	4.6	4.4	5
4	5.5	5.8	6.3	6.0	4
5	5.7	5.8	6.0	5.9	5
6	2.8	2.1	3.8	3.1	4
7	4.3	3.8	3.6	3.8	7
8	2.2	2.0	3.4	2.5	4
9	3.3	5.5	5.6	5.0	5
10	6.7	7.8	7.2	7.2	15
11	4.2	4.2	4.4	4.3	4
12	3.7	5.0	4.9	4.6	10
13	5.1	7.1	6.8	6.4	4
14	6.6	7.8	7.3	7.2	8
15	6.0	9.4	6.9	7.3	5
16	7.3	9.4	6.2	7.3	9
17	3.0	9.4	8.1	7.1	5
18	6.4	10.0	6.9	7.6	4

[a]Metropolitan Achievement Tests scores. Average denotes a mean taken over reading, spelling, and arithmetic scores.

[b]Choice-Motivator Scale difference scores.

Table 15

Raw Scores for EMR-HO Subjects

Subject	Areas Measured[a]				
	Reading	Spelling	Arithmetic	Average	M-H[b]
1	2.6	1.9	4.2	3.2	-8
2	2.2	2.9	4.1	3.3	-9
3	3.1	3.0	3.8	3.3	-3
4	1.7	3.0	3.0	2.6	-6
5	3.5	4.0	4.2	3.9	-7
6	2.0	2.7	3.6	2.8	-4
7	2.0	2.0	2.0	2.0	-5
8	1.9	1.4	2.9	2.1	-5
9	1.7	2.3	3.3	2.4	-3
10	6.0	6.1	6.8	6.4	-3
11	4.4	5.8	6.4	5.5	-6
12	5.3	6.8	5.8	6.0	-3
13	4.5	6.0	4.4	4.9	-5
14	3.6	4.2	3.1	3.6	-11
15	2.6	2.0	3.7	2.8	-12
16	4.7	6.8	5.0	5.4	-9
17	2.7	4.7	4.6	4.2	-7
18	3.8	3.5	5.0	4.3	-5

[a]Metropolitan Achievement Tests scores. Average denotes a mean taken over reading, spelling, and arithmetic scores.

[b]Choice-Motivator Scale difference scores.

Table 15

Raw Scores for DN-HO Subjects

Subject	Areas Measured[a]				
	Reading	Spelling	Arithmetic	Average	M-H[b]
1	4.9	5.5	5.0	5.1	-11
2	4.2	5.0	6.6	5.6	-4
3	2.1	3.9	2.0	2.7	-4
4	6.0	8.5	6.4	6.8	-3
5	4.4	5.4	6.3	5.6	-5
6	3.3	4.2	7.5	5.6	-5
7	6.3	6.3	8.1	7.2	-8
8	6.8	6.8	6.0	6.4	-4
9	5.3	5.5	5.7	5.6	-3
10	3.0	3.1	3.7	3.3	-7
11	3.7	3.6	4.7	4.0	-3
12	3.7	3.0	5.2	4.3	-5
13	4.4	6.7	7.1	6.3	-6
14	5.0	7.6	8.2	7.3	-5
15	2.6	1.3	1.9	1.9	-5
16	4.4	4.3	5.9	5.1	-3
17	5.7	6.4	9.1	7.6	-8
18	4.0	3.9	3.7	3.8	-4

[a]Metropolitan Achievement Tests scores. Average denotes a mean taken over reading, spelling, and arithmetic scores.

[b]Choice-Motivator Scale difference scores.

Table 16

Sex, CA, IQ, and Socio-Economic Data for EMR-MO Subjects

Subject	Sex	CA	IQ	Socio-a economic rating
1	M	13.9	76	35
2	M	12.4	61	48
3	M	16.0	63	D
4	M	14.1	70	44
5	M	15.4	73	47
6	M	13.7	72	34
7	M	12.2	67	U
8	M	12.3	59	48
9	M	14.7	76	S
10	M	14.7	73	48
11	F	15.4	74	63
12	F	15.2	77	63
13	F	15.1	64	D
14	F	13.5	73	45
15	F	14.2	77	34
16	F	13.8	55	54
17	F	14.5	72	63
18	F	14.0	68	34

[a]Code used: U--unemployed or unknown; S--separated; D--deceased

Table 16

Sex, CA, IQ, and Socio-Economic Data for EMR-HO Subjects

Subject	Sex	CA	IQ	Socio-economic rating[a]
1	M	13.9	65	62
2	M	15.0	71	62
3	M	14.0	67	U
4	M	16.8	64	65
5	M	13.3	70	48
6	M	14.7	66	U
7	M	14.0	70	60
8	M	13.7	70	54
9	M	14.2	76	69
10	M	14.0	76	U
11	F	14.2	77	48
12	F	13.9	60	U
13	F	13.6	70	U
14	F	13.7	76	U
15	F	13.7	61	65
16	F	16.1	72	S
17	F	12.8	73	U
18	F	14.7	76	54

[a]Code used: U--unemployed or unknown; S--separated; D--deceased

Table 16

Sex, CA, IQ, and Socio-Economic Data for DN-MO Subjects

Subject	Sex	CA	IQ	Socio-economic rating[a]
1	M	14.3	86	83
2	M	15.2	87	65
3	M	13.5	78	54
4	M	14.8	81	54
5	M	14.6	88	U
6	M	12.6	80	65
7	M	13.2	88	60
8	M	12.3	87	54
9	F	12.9	82	D
10	F	12.3	79	52
11	F	12.1	81	48
12	F	12.4	80	35
13	F	12.7	79	63
14	F	15.2	83	54
15	F	16.0	84	U
16	F	16.2	81	65
17	F	15.6	80	49
18	F	14.2	86	54

[a]Code used: U--unemployed or unknown; S--separated; D--deceased

Table 16

Sex, CA, IQ, and Socio-Economic Data for DN-HO Subjects

Subject	Sex	CA	IQ	Socio-economic rating[a]
1	M	12.2	81	65
2	M	13.5	82	65
3	M	12.2	86	73
4	M	19.3	89	52
5	M	14.2	87	48
6	M	16.7	79	63
7	M	14.8	89	58
8	M	13.2	81	D
9	M	12.7	85	54
10	M	12.3	84	54
11	M	14.0	80	62
12	M	15.0	81	58
13	M	14.4	86	60
14	M	16.0	81	U
15	M	12.5	83	65
16	F	13.4	85	U
17	F	15.1	87	65
18	F	13.3	85	U

[a]Code used: U--unemployed or unknown; S--separated; D--deceased

Table 17

Class Placement, Mental Age, and Deviation from Grade Level Expectancy on Achievement for EMR-MO Subjects

Subject	Grade	Mental Age	Areas Measured[a]			
			R	S	A	Avg.
1	SpCl	9.7	-3.0	-3.7	-1.5	-2.7
2	SpCl	6.5	+0.2	+0.5	+0.2	+0.3
3	8	8.2	+1.5	+4.1	+2.7	+2.7
4	SpCl	7.7	+0.3	+0.3	+0.6	+0.5
5	SpCl	9.4	-0.2	-2.0	+1.5	+0.2
6	SpCl	8.9	0.0	-0.1	+0.8	+0.2
7	4	7.2	+0.5	+1.1	+1.8	+1.3
8	6	6.2	+5.1	+4.5	+5.4	+5.1
9	7	10.0	+0.3	+1.5	+3.9	+2.3
10	7	9.4	-0.9	0.0	+2.3	+0.9
11	SpCl	9.7	-1.3	+2.1	-1.7	-0.6
12	SpCl	10.2	-1.6	-1.4	-0.6	-1.0
13	8	7.8	+2.5	+5.4	+4.0	+4.0
14	SpCl	8.7	0.0	+0.1	+0.5	+0.3
15	SpCl	10.0	-1.6	-0.3	-0.7	-0.9
16	5	6.2	+4.5	+5.3	+3.8	+4.4
17	7	9.2	+0.5	+2.6	+2.0	+1.8
18	8	8.4	+0.8	+2.7	+2.2	+2.0
Mean		8.53	+0.4	+1.3	+1.5	+1.1
Standard Deviation		1.33	2.03	2.51	2.00	2.02

[a]Code used: R--reading; S--spelling; A--arithmetic; avg.--average.

Table 17

Class Placement, Mental Age, and Deviation from Grade Level Expectancy on Achievement for EMR-HO Subjects

Subject	Grade	Mental Age	Areas Measured[a]			
			R	S	A	Avg.
1	SpCl	7.8	-0.2	-0.9	+1.4	+0.4
2	SpCl	8.9	-1.7	-1.0	+0.2	-0.6
3	SpCl	8.2	-0.1	-0.2	+0.6	+0.1
4	SpCl	8.9	-2.2	-0.9	-0.9	-1.3
5	SpCl	8.2	+0.3	+0.8	+1.0	+0.7
6	SpCl	8.1	-1.1	-0.4	+0.5	-0.3
7	SpCl	8.6	-1.6	-1.6	-1.6	-1.6
8	SpCl	8.2	-1.3	-1.8	-0.3	-1.1
9	SpCl	9.7	-3.0	-2.4	-1.4	-2.3
10	7	9.7	+1.3	+1.4	+2.1	+1.7
11	7	10.0	-0.6	+0.8	+1.4	+0.5
12	7	7.1	+3.2	+4.7	+3.7	+3.9
13	6	8.6	+0.9	+2.4	-0.8	+1.3
14	SpCl	9.7	-1.1	-0.5	-1.6	-1.1
15	SpCl	7.2	+0.4	-0.2	+1.5	+0.6
16	SpCl	10.2	-0.5	+1.6	-0.2	+0.2
17	SpCl	8.7	-1.0	+1.0	+0.9	+0.5
18	SpCl	10.0	-1.2	-1.5	0.0	-0.7
Mean		8.77	-0.5	0.0	+0.4	0.0
Standard Deviation		.95	1.42	1.72	1.37	1.41

[a]Code used: R--reading; S--spelling; A--arithmetic; Avg.--average.

Table 17

Class Placement, Mental Age, and Deviation from Grade Level Expectancy on Achievement for DN-MO Subjects

Subject	Grade	Mental Age	Areas Measured[a]			
			R	S	A	Avg.
1	SpCl	11.0	-0.3	0.8	-1.6	-0.4
2	SpCl	12.1	-3.2	-4.4	-1.5	-3.0
3	5	10.2	-1.0	-1.0	-0.6	-0.8
4	8	10.7	-0.2	+0.1	+0.6	+0.3
5	7	12.2	-1.5	-1.4	-1.2	-1.3
6	SpCl	10.0	-2.2	2.9	-1.2	-1.9
7	SpCl	10.8	-1.5	-2.0	-2.2	-2.0
8	SpCl	10.2	-3.0	-3.2	-1.8	-2.7
9	6	10.2	-1.9	+0.3	+0.4	-0.2
10	4	8.7	+3.0	+4.1	+3.5	+3.5
11	5	9.2	0.0	0.0	+0.2	+0.1
12	6	8.9	-0.2	+1.1	+1.0	+0.7
13	7	9.7	+0.4	+2.4	+2.1	+1.7
14	8	11.0	+0.6	+1.2	+1.3	+1.2
15	8	12.4	-1.4	+2.4	-0.5	-0.1
16	11	11.7	+0.6	+2.7	-0.5	+0.6
17	10	11.3	-3.3	+3.1	+1.8	+0.8
18	7	11.0	+0.4	+4.0	+0.9	+1.6
Mean		10.63	-.8	+.7	- .1	-.1
Standard Deviation		1.09	1.61	2.42	1.30	1.64

[a]Code used: R--reading; S--spelling; A--arithmetic; Avg.--average.

Table 17

Class Placement, Mental Age, and Deviation from Grade Level Expectancy on Achievement for DN-HO Subjects

Subject	Grade	Mental Age	Areas Measured[a]			
			R	S	A	Avg.
1	5	10.2	-0.3	+0.3	-0.2	-0.1
2	6	10.6	-1.4	-0.6	+1.0	0.0
3	SpCl	10.0	-2.9	-1.1	-3.0	-2.3
4	8	13.6	-2.6	-0.1	-2.2	-1.8
5	7	11.3	-1.9	-0.9	0.0	-0.7
6	7	12.1	-3.8	-2.9	+0.4	-0.2
7	7	12.4	-1.1	-1.1	+0.7	-0.2
8	6	10.2	+1.6	+1.6	+0.8	+1.2
9	6	10.6	-0.3	-0.1	+0.1	0.0
10	4	9.7	-1.7	-1.6	-1.0	-1.4
11	SpCl	10.3	-1.6	-1.7	-0.6	-1.3
12	SpCl	10.7	-2.0	-2.7	-0.5	-1.4
13	7	11.0	-1.6	+0.7	+1.1	+0.3
14	9	11.8	-1.8	-0.8	+1.4	+0.5
15	SpCl	9.4	-1.8	-3.1	-2.5	-2.5
16	7	10.6	-1.2	-1.2	+0.3	-0.5
17	7	12.1	-1.4	-0.7	+2.0	+0.5
18	SpCl	10.7	-1.7	-1.8	-2.0	-1.9
Mean		10.95	-1.5	-0.9	-0.2	-0.7
Standard Deviation		1.07	1.13	1.30	1.42	1.05

[a]Code used: R--reading; S--spelling; A--arithmetic; Avg.--average.

APPENDIX B

APPENDIX B

Choice-Motivator Scale, Form B

For each pair of choices below underline the one you would rather be or do if you had to choose between them and were able to do or be either of them. Then state briefly why you made this choice.

1. a. House painter — b. Railroad engineer

   Why?

2. a. Navy officer — b. Janitor

   Why?

3. a. Collect coins — b. Collect guns

   Why?

4. a. Plumber — b. Farmer

   Why?

5. a. Dentist — b. Game Warden

   Why?

6. a. Go dancing — b. Go to a movie

   Why?

7. a. Bookkeeper — b. Policeman

   Why?

8. a. Indoor work — b. Outdoor work

   Why?

9. a. Taxi driver — b. Shoemaker

   Why?

10. a. Dentist — b. Cook

    Why?

11. a. Electrician — b. Musician

    Why?

12. a. Go bowling b. Watch a football game

Why?

13. a. Teacher b. Cattle rancher

Why?

14. a. Bartender b. Mailman

Why?

15. a. Butcher b. Truck driver

Why?

16. a. Live in the country b. Live in the city

Why?

17. a. Baseball player b. Barber

Why?

18. a. Fireman b. Social worker

Why?

19. a. Forest ranger b. Mechanic

Why?

20. a. Read a book b. Walk around downtown

Why?